

## EXPRESSIONS OF INTEREST (CONSULTING SERVICES – FIRMS SELECTION) FEASIBILITY STUDY OF HYBRID COOLING TOWER SYSTEM FOR GEOTHERMAL POWER PLANTS : KGN-BDD-01-2017

(Reference No. P153179 - Credit No: 5844-KE)

### 1.0 GENERAL INFORMATION

The Kenya Electricity Generating Company Limited (KenGen) has applied for financing from the World Bank toward the cost of the **Feasibility Study of Hybrid Cooling Tower System for Geothermal Power Plants**, and intends to apply the proceeds for consulting services. The Company is a limited liability company, registered under the Companies Act of the laws of Kenya. The Company was incorporated in 1954 with its core business being development, management and operation of power generation plants. KenGen is listed on the Nairobi Stock Exchange and it is owned 74% by the Government of Kenya, and 26 % by the public.

Today, KenGen is the leading electric power producer in Kenya, with an installed capacity of 1,635MW equivalent to about 70% of the national capacity. KenGen utilizes various primary sources of energy to generate electricity ranging from hydro, geothermal, thermal and wind.

As at January, 2017, Kenya has developed 672.5MW of geothermal in 36 years out of a potential of over 10,000MW and is currently at position 7 in the world. KenGen contribution to the national geothermal total is 533.5MW (79.3%) mainly in the proven Olkaria Geothermal Field with at least 1000MW potential. Olkaria I-45MW, Olkaria II-105MW, Olkaria IAU-150MW, Olkaria IV-150MW and Wellheads – 83.5MW. Additional plants are planned in Olkaria field over the next 5 years namely, Olkaria I-Unit6 (70MW), Olkaria V-140MW, Olkaria VI- 140MW, Olkaria VII-140MW and Wellhead Leasing-50MW.

Geothermal power generation is classified as a renewable energy; however its renewability is partly a function of the amount of separated brine and steam condensate (blow-down) that can be re-injected back into the reservoir. Currently, all of the separated brine is reinjected back into the reservoir; however, only about 25% of the condensed steam is reinjected after approximately 75% is evaporated into the atmosphere because of direct air contact cooling towers. It is hypothesized that if a different type of cooling method is used, more steam condensate could be retained as water available for reinjection. One such solution may be to use a Hybridized cooling tower with both air and direct contact coolers or other cooling system options using proven technology. By using a cooling system design that minimizes water use, the sustainability of the geothermal resource could be improved through the re-injection of more water to recharge the reservoir.

### 2.0 SCOPE AND OBJECTIVES OF THE STUDY

The consulting services (“the Services”) will be for an estimated period of four (4) months and the scope of services include but not limited to the following:

- i) Perform a design analysis, evaluate and advise KenGen regarding the use of condensate cooling systems for geothermal applications based on current technologies that would increase the amount of condensate available for reinjection.
- ii) Identification of at least two best cooling system options for implementation in KenGen’s future power plants that are based on existing technologies and that could substitute the current condensate cooling system methods in order to reduce the amount of water lost through the direct contact cooling towers.
- iii) Conceptual design for the recommended option of hybrid cooling tower and associated major structures including their cost estimates.
- iv) An evaluation of the technical parameters, advantages and disadvantages for each proposed cooling system option which shall include; a) the space requirements necessary to accommodate the physical size of the cooling system, b) the resulting heat balance of the proposed system, c) the mass balance of the proposed system, d) identification of the amount of water saved by the proposed system when compared to the existing direct contact cooling towers and, d) the parasitic load of the proposed system with a direct comparison to the current direct contact cooling tower parasitic load.
- v) Propose minimum site investigations for the recommended option including topographical survey, geo-survey and geotechnical Investigations;
- vi) Preliminary Environmental and Social Impact Assessment;
- vii) Financial and Economic Analysis;
- viii) Risk analysis and mitigation; and
- ix) Transfer of knowledge to client’s counterpart personnel.

The Kenya Electricity Generating Company Limited now invites eligible consulting firms (“Consultants”) to express their interest in providing the Services. Interested Consultants should provide information demonstrating that they have the required qualifications and relevant experience to perform the Services.

### 3.0 EVALUATION CRITERIA

In order to be short listed the interested consultant must satisfy the following minimum criteria:

- (a) Have undertaken at least two feasibility study assignments for development of **geothermal** power plant(s) in the last 10 years and demonstrate at least 10 years of experience in designing **geothermal** power plants, steam delivery/brine disposal systems and associated grid connection facilities;
- (b) Have undertaken at least two feasibility study assignments for development **thermal** power plant(s) in the last 10 years and demonstrate at least 10 years of experience in designing **thermal** power plants, steam delivery/management systems and associated grid connection facilities;

- (c) Demonstrate at least 10 years of experience in consulting services for geothermal resource assessment; and
- (d) In addition to the firm’s experience, provide a list of proposed professional staff and disciplines expected to take part in the feasibility study.
- (e) Demonstrate a strong financial status by positive cash flows, minimum average annual turnover of USD 1 Million, net worth and profitability.

The attention of interested Consultants is drawn to paragraph 1.9 of the World Bank’s *Guidelines: Selection and Employment of Consultants IDA Credits by World Bank Borrowers* Jan 2011(Revised July 2014) (“Consultant Guidelines”), setting forth the World Bank’s policy on conflict of interest.

Consultants may associate with other firms in the form of a joint venture or a sub-consultancy to enhance their qualifications.

A Consultant will be selected in accordance with the Quality and Cost Based Selection (QCBS) method set out in the World Bank’s Consultant Guidelines.

Further information can be obtained at the address below during office hours 0900 to 1700 hours East Africa Time (EAT).

### 4.0 DOCUMENTS TO BE SUBMITTED

- a) Documents detailing that the party (ies) fulfils the minimum requirements in part 3 above
- b) Certificate of incorporation (and any certificate of change of name), certified by an authorized representative of the bidder
- c) Audited Financial Statements for the last 3 years including, Tax registration and Tax compliance certificates or equivalent documents applicable in the bidder’s Country of origin. (For consortium arrangements, each member must meet the requirements)
- d) List of consultancy services on Geothermal and Thermal Feasibility studies and power plant design carried out in the last 10 years. Including a brief description of the study (scale and scope) and the status of the projects;
- e) Where the Applicant is a consortium, a list of the proposed members of the consortium and the proposed Leader of the consortium and the roles of each member

### 5.0 CLARIFICATIONS

The interested parties may request for clarifications on this Expression of Interest up to Seven (7) days before the EOI submission date. Any request for clarification must be sent in writing by paper mail, facsimile, or electronic mail to:

**Capital Planning & PPP Manager**  
**Kenya Electricity Generating Company Limited,**  
**Stima Plaza III, Kolobot Road, Parklands,**  
**P.O. Box 47936 – 00100,**  
**Nairobi, Kenya.**  
**Tel: +254-20-3666427**  
**Fax: +254-20-2248848**  
**Email: enjenga@kengen.co.ke**  
**CC fmakhanu@kengen.co.ke, ; wochieng@kengen.co.ke; tenders@kengen.co.ke,**

### 6.0 SUBMISSION OF THE EOI

The EOI (**1 Original and 2 copies**) should be submitted in a sealed envelope by **1400 hours (East African Time) on 15<sup>th</sup> February 2017** to the following address:

**Company Secretary & Legal Affairs Director,**  
**Kenya Electricity Generating Company Limited,**  
**KenGen RBS Building, 10th Floor next to Stima Plaza III,**  
**Kolobot Road, Parklands**  
**P. O. Box 47936 - 00100,**  
**Nairobi, Kenya**

Information on the outer envelope should also include: Confidential, FEASIBILITY STUDY OF HYBRID COOLING TOWER SYSTEM FOR GEOTHERMAL POWER PLANTS: **Do not open before, 15<sup>th</sup> February 2017 at 1400hrs East African Time.**

The bid document must be dropped in the tender box located on the ground floor of Stima Plaza Phase III

Tenders will be opened immediately thereafter in the presence of bidders representative who choose to attend at Pension Plaza 2 ground floor or alternative venue which will be communicated by the Procuring Entity.

### SUPPLY CHAIN DIRECTOR